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EDITORIALS

Incidental findings on imaging

Common, potentially harmful, and important information for patients considering tests

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As O'Sullivan and colleagues show in a linked article (doi:10.1136/bmj.k2387),¹ unexpected anomalies discovered during imaging are common. However, they are also problematic.²⁻⁴ Even though most unexpected anomalies are unlikely to be clinically relevant, often the clinician and patient want to evaluate them further as both are unwilling to accept the uncertainty that often surrounds the diagnosis and subsequent clinical course of the anomaly.⁵

Occasionally such a discovery can be beneficial and even life saving,⁶ but it can also be harmful. A suspicious lesion can lead to lifelong follow-up, further imaging and appointments, unwarranted treatment, and even radical surgery, only for the finding to be ultimately innocuous.⁷ Furthermore, unexpected anomalies can cause anxiety (for patients and clinicians) and incur financial penalties, including implications about future medical and life insurance.⁴ Such costs to individuals led to the acronym "VOMIT" (victims of modern imaging technology), described in 2003 in this journal.⁸ Since then there has been a steady increase in the use of imaging, and now 82 magnetic resonance imaging and 151 computed tomography examinations are performed per 1000 population every year in the 11 highest income countries.⁹ The associated increase in unexpected anomalies discovered during imaging causes substantial downstream effects within healthcare systems,¹⁰ or "SPEW" (scans propagating exponential workloads).¹¹

Although it can be argued that such harmful discoveries are unintentional, the possibility of unexpected anomalies and their potential for harm are well known.⁷ If we are to first do no harm, we should change our mindset and start thinking of unexpected anomalies as side effects of medical imaging, and seek fully informed consent before going ahead.¹¹ To aid this shared decision making,⁴ O'Sullivan and colleagues are to be commended for their scholarship in completing a Herculean analysis of an entire literature on the prevalence of these "incidentalomas."¹

As the authors describe, the challenge in pooling data is that individual studies have widely varying patient characteristics (and large differences in prevalence of incidentalomas between different age groups), imaging protocols (some study protocols

are better than others at detecting incidentalomas), and definitions of incidentaloma (in many studies the definitions are not clear and normal variants are not prespecified).¹² If clinicians share these data with patients to inform consent for imaging, both parties must proceed with caution and a clear understanding of how these were derived.

The authors defined incidentaloma as "an imaging abnormality in a healthy, asymptomatic patient or an imaging abnormality in a symptomatic patient, where the abnormality is not apparently related to the patient's symptoms."¹ In the context of radiological diagnostics perhaps a more useful definition of incidentalomas is "those findings that are discovered by chance which can *potentially affect the health* of an individual."⁷ This would include other potentially harmful lesions such as large cerebral aneurysms in addition to the possible malignancies reported by O'Sullivan and colleagues. A further benefit would be that many normal variants, physiological features, or clinically irrelevant lesions would be excluded from the prevalence. The estimated prevalence of incidentaloma using these two different definitions may differ by an order of magnitude.¹²

While the prevalence of malignancy in incidentalomas is useful for decision making, clinicians and patients should be aware that malignant neoplasms in one organ system can sometimes confer better survival than benign neoplasms in another. For example, overall survival is worse for benign gliomas than it is for thyroid malignancies.^{13 14} If benign gliomas, which transform to malignant gliomas, were included in the malignancy rates given in the linked paper, the prevalence of brain "malignancy" among incidentalomas would increase by two orders of magnitude.^{12 15} This information is important—although the absolute numbers of benign gliomas are relatively small, their incidental discovery turns lives upside down.

Although making a careful risk assessment with patients before pursuing an investigation is a central part of every clinician's job, incentives that reward overactivity might confound this optimal approach.^{7 16} Discussion about the prevalence of incidentalomas before an imaging test is likely to be beneficial

in many scenarios, particularly where clinicians are under pressure to investigate.¹¹

However, there are many evidence based guidelines that recommend practical approaches to requesting imaging.¹⁷ Better adherence to this guidance would also reduce the harmful overdiagnosis of conditions that will never cause symptoms or shorten a patient's life.¹⁶

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